

**Municipal Separate Storm Sewer System (MS4) Audit
Norfolk, Virginia
April 26 - 28, 2005**

Prepared for:
EPA Region 3
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EXECUTIVE SUMMARY

Detailed findings from the Municipal Separate Storm Sewer System (MS4) audit conducted at Norfolk, Virginia on April 26 - 28, 2005 are presented in this report. The major general findings from the MS4 audit are as follows:

Update Storm Water Management Plan (SWMP).

The City's SWMP dated 1994 has not been updated since that time.

The City must prepare an updated SWMP which accurately reflects Norfolk's current stormwater management program.

Enhance communication and coordination among all parties responsible for implementing the SWMP.

Responsibility for implementation of the stormwater program is primarily based within two City organizations - the Bureau of Environmental Services within the Department of Planning and Community Development and the Division of Environmental Stormwater Management within the Department of Public Works and also with the Hampton Roads Planning District Commission. Active communication, coordination, and data sharing between these organizations are critical to ensure that the stormwater program is effective in moving toward the ultimate goal of improving water quality.

The City should develop and implement formal Memorandums of Understanding (MOUs) detailing each organization's responsibilities. Reviews should be conducted and modifications made to existing MOUs as appropriate.

Improve the amount and type of information in the Indicators section of the Annual Report.

The stormwater program effectiveness indicators included in the City's current permit may not be adequate to show actual water quality improvement.

In its upcoming permit reissuance, the City should consider what indicators would be appropriate to show improved water quality based on the pounds of pollutants of concern reduced. Effectiveness of the structural and nonstructural controls employed by Norfolk should be more directly linked with water quality improvements.

Increase resources to implement the stormwater management program.

Several elements of the City's stormwater management program did not appear to have adequate staff and/or resources for implementation (e.g., maintenance activities, construction site inspections, industrial facility inspections). Although the stormwater program is funded through a stormwater utility, there has been no increase in stormwater fees since 1998.

The City should evaluate its current funding situation and the funding needed for adequate implementation of its stormwater program. If additional revenue is unavailable, current spending priorities should be re-evaluated and revised to give priority to those program items necessary for permit compliance and environmental

health and safety, industrial storm water, and illicit discharge detection in particular.

Municipal Separate Storm Sewer System (MS4) Audit

Norfolk, Virginia

April 26 - 28, 2005

INTRODUCTION

At the request of the U.S. Environmental Protection Agency (EPA) Region 3, a Municipal Separate Storm Sewer System (MS4) Audit was conducted on April 26 - 28, 2005, at the City of Norfolk, Virginia. The audit team included Jesse Salter, Dianne Stewart, and Carol Winston of Science Applications International Corporation; Paula Estornell and Chuck Schadel of Region 3 EPA; and Doug Fritz, Fran Geissler, and Art Kirkby of the Virginia Department of Conservation and Recreation (DCR).

The City of Norfolk (City) was issued Permit No. VA0088650, effective from March 8, 2001 to March 8, 2006. Norfolk is currently the single permittee holder for the MS4 permit (i.e., there are no co-permittees). Under the permit, the City is required to implement its Storm Water Management Plan (SWMP). The City's SWMP is dated September 1994 and has not been updated since that time.

The remainder of this report summarizes the findings of the MS4 audit organized by the individual components described in the City's FY2004 Annual Report (FY04 Annual Report) and is in the same order and format as the City's Virginia Pollutant Discharge Elimination System (VPDES) permit. Each program component section contains a summary of the findings associated with each program component and required and recommended actions.

FINDINGS

Maintenance Activities and Schedule for Structural Controls (Permit Section I.A.1.a.1)

Storm Sewer Utility Maintenance

Section 2.2.4 of the SWMP indicates that the City has an established program for maintenance of the storm drain system with pipes and structures scheduled to be cleaned and inspected for repairs two times per year. Staff stated that the City's maintenance program for the storm sewer system (i.e., storm sewer pipes, catchbasins) is primarily complaint-driven, with the exception that preventive maintenance is conducted in problem areas (particularly when a large storm is forecast). The problem areas were identified based on historical information as well as information compiled during a preliminary assessment of the storm system. Similar to the maintenance program for sewer pipes and catchbasins, the City performs maintenance on non-tidal ditches on a complaint-basis with the exception that preventive maintenance is conducted in problem areas. The City would like to implement a planned maintenance schedule, but is uncertain whether they can do this with the current limited staff resources.

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The Division of Vector Control, Department of Public Health performs maintenance on the tidal marsh ditches.

The City has a work management system (QBIC) to document maintenance activities. Complaints are received by the City through e-mails, calls to the customer services representative, and requests from City Council. A complaint is directed by the customer service representative to the appropriate supervisor for follow-up action. The City has three crews that deal with maintenance and repairs and address more than 1,000 work orders per year.

A City crew will perform the required maintenance if it is a relatively simple problem. To perform repair work which is beyond the capabilities of the City staff, Norfolk can use its existing maintenance contracts if funding is available. The City budget includes about \$200K for repair and maintenance of the system. The City will use funds from either the Operations and Maintenance (O&M) budget or the Capital Improvement Program (CIP), depending on the maintenance to be performed.

In determining the timeframe for performing maintenance work, City staff evaluate safety concerns and the impact of the problem on the public as well as available funding. In situations where problems can't be fixed, Mr. Michael Schaffer, City Storm Water Engineer, educates the public regarding the issues. Norfolk's backlog of capital improvements projects in 2003 were estimated to cost about \$100 million. (See related discussion in *Flood Management* section.)

As part of the Master Plan update in 2003, the City began to re-survey some areas (e.g., the downtown). Using the new survey information, the City is planning to perform system modeling, which is being done slowly because it is very expensive. The City's goal is to complete re-surveying of the storm system within the next ten years, but the re-surveying would need to be funded from the CIP budget. The City has also completed the storm sewer outfall inventory in a few areas. The City's goal for completing the outfall inventory of the storm system is within the next five years. As stated in the FY04 Annual Report, the City is planning to start an outfall dredging program possibly within the next year.

Other maintenance projects include renovating more than half of the City's stormwater pumps to include upgrading the electronic controls, replacing or rebuilding the pump, providing remote monitoring, and putting generators inside the building or putting hookups for generators outside the building. Upgrade of the downtown pump station is costing almost \$1 million. Costs for pump station upgrades usually range from \$300-\$800K.

Best Management Practices (BMPs) Inspection, Re-inspection, and Maintenance Program
Ms. June Moser, Environmental Specialist, conducts annual inspections of BMPs. All BMP inspections (both City and private BMPs) are recorded in the FoxPro database. A total of approximately 400 BMPs is included in the City's tracking system. All BMPs except ponds are inspected once per year. Ponds are inspected two times per year because the City identified issues related to ponds (e.g., erosion/slope maintenance). In addition, other BMP inspections

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can be more frequent if problems are found at a given location.

The City evaluates the problems identified during inspections and who should perform the repair. Norfolk has a lot cleaning crew, which performs maintenance on City BMPs. The lot cleaning crews drive by BMPs on a frequent basis and also respond to complaints.

For private BMPs, the City uses a Declaration of Covenants, which is signed by the property owner and recorded with the deed to require property owners to maintain their BMPs. The City inspects private BMPs on the same schedule as the City BMPs. If there is a violation, Ms. Moser prints out the BMP inspection report, which is sent to the responsible person with notes on what needs to be fixed. If the problem is not fixed, Ms. Moser issues a Uniform Notice of Violation. If the problem is still not fixed, the City has the ability to issue a summons. To date, it has not been necessary for the City to issue a summons to get a problem fixed. Ms. Moser indicated that when a BMP pond with algal problems is identified, the BMP owners are sometimes referred to private companies who chemically treat the pond. Killing off the algae, which play an important role in nutrient uptake and increase BMP efficiency, may not be the best solution.

The City is planning to evaluate the existence of Declaration of Covenants (i.e., maintenance agreements attached to the deed for a property) for all private BMPs. The City has a new Declaration of Covenants for BMPs that drain right-of-way water. This will be used where a BMP is established in a small subdivision which drains right-of-way water. In these cases, the City rather than the property owner will perform major maintenance on the BMP. The City's acceptance of responsibility for major maintenance of these private BMPs will put an additional burden on the current limited budget for maintenance activities.

The MS4 audit team observed a City inspector conduct inspections of the BMPs at the asphalt plant and school bus depot. The MS4 audit team observed some areas at these BMPs that should have been inspected but were not. For example, the City did not previously observe or investigate outfalls at the BMPs, and a previous inspection of the school bus yard BMP apparently did not include the status of the pond or outfall. Detailed findings associated with these inspections are found in Appendix A.

Required actions: *In accordance with Section I.A of Permit No. VA0088650 and Section I.A.1.a.2, the City must update its Storm Water Management Program which includes applicable components of the Comprehensive Plan, the Storm Water Management Master Plan and all related storm water ordinances.*

Recommended actions: *The City should do the following:*

- (1) in accordance with its SWMP, move toward a proactive maintenance program with regularly scheduled maintenance activities. The City should ensure that adequate staff and resources are available to implement the proactive maintenance program (i.e., scheduled structural controls inspection and maintenance activities).*
- (2) document the location of historical problem areas for follow-up and inclusion in any proactive maintenance program.*

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(3) *begin to evaluate the existence of Declarations of Covenants for all private BMPs.*

Regarding BMP inspections, the City should do the following:

(1) *ensure that all areas of BMPs (e.g., outfalls) are inspected and that follow-up actions are taken to address any identified deficiencies or maintenance needs.*

(2) *develop guidelines with various options to address BMPs with algal problems.*

Chemical treatment to kill the algae may not always be the most appropriate solution. For example, in some situations, other options such as aeration may be a more appropriate solution.

Enforcement of the Comprehensive Plan, Master Plan, and Other Related Ordinances Pertaining to Development and Redevelopment (Permit Section I.A.1.a.2)

The City distributes a Site Plan Submittal Package which covers the site plan review process to developers. The City's requirements related to plan submittal and approval are included in several ordinances described below.

- *Chapter 26: Site Plan Review* includes requirements for the site plan submittal, site plan contents, erosion and sediment control, Chesapeake Bay Preservation Areas (CBPA), CBPA site plan content, environmental site assessment, landscape plan, stormwater management plan, and water quality impact assessment.
- *Chapter 11.2: Chesapeake Bay Preservation Area Overlay District* includes the performance standards for development and redevelopment within these areas.
- *Chapter 15: Erosion and Sediment Control* includes minimum standards for erosion and sediment controls which reference the Virginia Erosion and Sediment Control Handbook, enforcement and inspection authority, and enforcement tools.
- *Chapter 42.4: Subdivisions* includes procedures for preliminary and final plan approval, design standards, and required improvements.
- *Chapter 45: Trees and Other Vegetation* requires any person who is within the Resource Protection Area (RPA) or Intensely Developed Area (IDA) in the Chesapeake Bay Protection Act overlay district to first obtain a permit before planting or conducting activities that impact a tree, shrub, or other vegetation.

Norfolk is proposing to change its RPA to IDA. These changes were approved by the Norfolk City Council and will be submitted to the State for a consistency review in June 2005. The Bureau of Environmental Services staff indicated that the reason for this change is to facilitate the process whereby homeowners can build secondary structures (e.g., garage, shed) on their lots, which are already located within the CBPA RPA. During an interview, Mr. Lee Rosenberg, Manager, Bureau of Environmental Services, and Mr. Brian Ballard, Senior Planner, Bureau of Environmental Services, stated that since the RPA represents about 10% of the City's land, loss

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of the RPA, when converted to IDA, would have a nominal impact. Further, Mr. Rosenberg stated that he was unaware of the permit requirement to report the Greenlands acreage. It did not appear that the Bureau of Environmental Services staff who have been leading the effort to change the RPA to IDA have communicated or coordinated with the Division of Environmental Stormwater Management staff to determine what impact the change may have on the stormwater program effectiveness and the ultimate goal of improved water quality. (See additional discussion in the *Stormwater Program Effectiveness Indicators* section.) Graphs in the Hampton Roads Planning District Commission publication *Indicators of Stormwater Management Program Effectiveness, Fiscal Year 2003-2004* include RPAs in the Greenlands indicators as *Green Areas Protected and Restored, FY 2004*.

Norfolk's site plan review process is coordinated through one central person who is responsible for distributing plans to numerous reviewers, compiling the comments, and notifying the developer of the comments. Reviews related to stormwater requirements are provided by:

- Mr. Brian Ballard, Senior Planner, who reviews the Erosion and Sediment Control (ESC) Plans for sites located within the CBPA Overlay district, and Mr. Seamus McCarthy, Environmental Specialist, who reviews the ESC Plans for sites located in areas outside the CBPA Overlay district and for CBPA minor site plans. They both follow the checklist included in the Virginia Erosion and Sediment Control Handbook, but do not complete the checklist as documentation.
- Mr. Randy Thomson, Civil Engineer, who reviews the stormwater management plan submittal. Mr. Thomson follows the Site Stormwater Plan Submittal Requirements (i.e., Table 1.1) in the Storm Water Design Criteria Manual dated June 1994; he documents his comments in a memorandum which is placed in his files.
- Ms. Brenda Lamon, Parks and Forestry, who reviews the landscaping plan as well as any tree removal issues.

All reviewers were very knowledgeable in the procedures of review for which they are responsible.

BMPs must be designed in accordance with the City's Storm Water Design Criteria Manual dated June 1994 (Criteria Manual). Water quality performance standards for BMPs are as follows:

- for new development, the post development nonpoint source pollution runoff load must not exceed the pre-development load.
- for redevelopment, the existing nonpoint source pollution load must be reduced by at least 10%.

City staff noted that these performance standards are applied throughout the whole City, both within and outside the CBPA overlay district. The Criteria Manual indicates that peak discharge rate performance standards are based on the 2-year and 10-year frequency storms. The City noted that they no longer use the 2-year storm event standard but rather require all site plans meet the peak discharge for the 10-year storm or meet MS-19 requirements.

Required actions: None.

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Recommended actions: *The City should do the following:*

- (1) The proposed change in the City's RPAs to IDAs may impact the effectiveness of the City's stormwater management program (e.g., amount of Greenlands). The Bureau of Environmental Services staff should communicate and coordinate with the Division of Environmental Stormwater Management staff regarding this proposed change and its impact on the stormwater program effectiveness and moving toward the goal of improved water quality.*
- (2) City reviewers should complete the checklist for reviewing ESC plans in the Virginia Erosion and Sediment Control Handbook as documentation of the review.*

Maintain Existing Programs to Reduce Impacts on Water from Street Maintenance (Permit Section I.A.1.a.3)

Section 2.2.5 of the SWMP indicates that the City will sweep the downtown area every day, with all other areas cleaned every four to eight weeks. City staff indicated that they sweep the immediate downtown area daily; in addition, the City's *Guide to Street Sweeping* had eight-week street sweeping schedules for the East and West areas and indicated that the Central area is swept according to posted signs. These brochures are updated annually.

City staff perform asphalt and concrete repairs and have a small stockpile/debris area at the Streets and Bridges facility. They have a contract with a landfill for disposing of the debris; asphalt and concrete are recycled.

The City has an asphalt plant located at the Division of Streets and Bridges facility. Although this facility previously had a stormwater permit from the Virginia Department of Environmental Quality (VADEQ), City staff indicated that VADEQ told them a stormwater permit was no longer needed. The site is covered by permits for its aboveground/underground storage tanks and its baghouse. The FY04 Annual Report stated that the facility maintains a Pollution Prevention Plan, but the document provided was a Spill Prevention, Control, and Countermeasures Plan (SPCC). The SPCC plan is not primarily focused on stormwater issues, but it specifies daily and weekly inspections that, if implemented, would reduce the risk of pollutant discharge from the facility.

The MS4 audit team inspected the asphalt facility, and the detailed findings are included in Appendix A. During the inspection, it was found that the City's street sweeping equipment is washed on the asphalt with the wastewater discharged to the BMP and into an offsite wetland. In addition, interior floor drains were found to be attached to the storm drainage system and had discharged soap into the storm drainage system from other washing activities.

The City recently started an inspection program for its Public Works municipal operations/facilities and developed a checklist for these inspections. The City's asphalt plant will be inspected under this program.

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Required actions: In accordance with Sections I.A.1.a.3, I. A.1.b.3, I.A.1.c, and I.B.4 of Permit No. VA0088650, the City must do the following:

- (1) apply for an NPDES industrial storm water permit from VADEQ and as part of the state requirements, develop and implement a Pollution Prevention Plan for the asphalt plant to ensure that all aspects of stormwater are adequately addressed.;
- (2) contact VADEQ to re-evaluate whether a VPDES permit is needed to cover the discharge of process wastewater from its street sweeper washout system.

Recommended actions: Relative to the asphalt plant the City should consider the following:

- (1) ensure that the raw material storage areas at the asphalt plant are managed such that the material does not overflow the containment bins.
- (2) ensure that storage tanks of diesel fuel and degreaser have provisions for secondary containment. Currently, spills from these units could enter the BMP pond.

Existing Flood Control and Proposed Flood Control Projects (Permit Section I.A.1.a.4)

Regarding future flood management projects, the City developed a Capital Improvements Program Prioritization Plan (Prioritization Plan), published in 2002. The purpose of the project was to assist the Norfolk Department of Public Works in identifying and prioritizing deficient storm drain areas. The Prioritization Plan prepared a list of the 100 most needed capital improvement projects, organized, but not prioritized, by drainage area. Generally Norfolk focuses on quantity issues (i.e., flooding), but also evaluates water quality. The City's annual CIP budget of about \$2 million is broken into the following four categories:

Bulkhead master plan - \$500K
Neighborhood flood reduction projects - \$500K
Water quality projects - \$400K
Stormwater facilities (upgrading pump stations) - \$600K.

The City's ability to implement projects that include water quality features is severely limited by its budget. Based on the current budget, City staff estimate that they are able to complete two or three projects from the Prioritization Plan each year.

The City is not retrofitting existing projects, except for structures that need immediate attention (e.g., collapsed pipes). These projects mainly involve bringing the structure or service back up to a functional level. Norfolk has done several wetlands projects to improve water quality. The City is also conducting ongoing assessments (e.g., studying the infrastructure and updating the mapping); the information will be used to model the system to determine potential flooding areas and associated upgrade needs.

Required actions: None.

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Recommended actions: *The City should continue to assess water quality impacts of flood management projects and address its CIP project needs in an expeditious manner.*

Application of Pesticides and Fertilizers (Permit Section I.A.1.a.5)

The City has a Neighborhood and Leisure Service, Bureau of Parks and Urban Forestry *Work Management Procedures Manual* dated June 3, 2004, which includes information on pesticides application, application locations, and types of pesticides used. Each time a City employee applies pesticides, he or she completes the daily form, and a routine maintenance time report which is then fed into a ScanTron work management database. The City can query the database to obtain summary data on amounts and types of pesticides applied and determine the amounts of pesticides to be purchased.

About 100 City employees are certified as either registered technicians or commercial applicators in accordance with the Virginia regulations as implemented by the Department of Agriculture and Consumer Services. Copies of *Applying Pesticides Correctly - A Guide for Private Applicators, Commercial Applicators and Registered Technicians in Virginia* (Virginia Core Manual) prepared by the Virginia Cooperative Extension are kept at Parks and Urban Forestry facilities for use by City staff. The manual covers pesticides handling, application procedures, transportation, storage, disposal, and spill clean-up. The City uses Integrated Pest Management Practices as appropriate.

The City entered into an agreement with the DCR to (1) implement a Nutrient Management Plan (NMP) approved by DCR regarding the amount, placement, timing, and application of nutrient-containing materials such as fertilizers and (2) teach employees to use the NMP to responsibly apply and handle lawn care products. The agreement is effective through February 1, 2008. The City developed and is using an Urban Nutrient Management Application Worksheet.

The City stores its pesticides in a caged and locked area at a Parks and Urban Forestry facility. The City follows the Virginia Department of Agriculture pesticide storage guidelines.

Per the FY04 Annual Report, the City planned to provide a training seminar for City personnel responsible for performing on-site facility inspections; prepare a list of commercial applicators in the city; and perform on-site inspections of loading and unloading areas for commercial applicators. The FY04 Annual Report noted that a program to address commercial applicators was initiated in FY98 and is administered by the Fire Marshals office. Mr. Jim Stanek from the Fire Marshals Office indicated that his supervisor was implementing a program related to commercial pesticide applicators, but he was not familiar with the specific details of the program. No City staff could provide information about this program.

Required actions: *None.*

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Recommended actions: *The City should do the following:*

(1) ensure that the Division of Environmental Stormwater Management staff become familiar with its commercial applicators program discussed in the FY04 Annual Report. If the City is currently not implementing this program, the Annual Report should be updated to reflect this.

(2) ensure that the Bureau of Parks and Urban Forestry employees are well versed on the Nutrient Management Plan so that they can effectively reduce nutrient loads to the Chesapeake Bay.

Prevention of Illicit Discharges to the Storm Sewer System (Permit Section I.A.1.b.1)

Section 41.1 of the City Stormwater Management ordinance prohibits the following materials from being put into or discharged to the stormwater system:

- filth, animal or vegetable matter, chips, compost, construction debris, shavings, or any other substance or pollutant whether solid or liquid.
- gasoline, oil waste, antifreeze, or other automotive, motor or equipment fluids.
- any commercial, industrial or manufacturing process water, wash water, or unpermitted discharge.
- anything that impedes or interferes with the free flow of stormwater therein.
- chlorinated swimming pool water.

It is a Class I misdemeanor to discharge any of the above items. The City has an Environmental Crimes Task Force staffed by special police officers. Both Ms. Moser and Mr. Whitehurst, Management Analyst for the City, are special police officers and can issue a summons to anyone found to be in noncompliance. Other Task Force members include the Hazmat fire investigators. The City appears to be committed to reducing environmental crimes and presented information indicating success in this commitment.

A review of the reported complaints in the City's FY04 Annual Report identified that the disposal of certain materials into the storm sewer system was not classified as an illicit discharge. For instance, sanitary sewer overflows (SSOs) are not reported as illicit discharges. Disposal of grass clippings, broken glass, and dog wastes into the storm sewer system are other examples of events that were investigated by the City as complaints but not reported as illicit discharges.

Required actions: *In accordance with Sections I. A.1.b.1, I. A.1.b.3, and I. A.1.b.7 of Permit No. VA0088650, the City must do the following:*

(1) Report as illicit discharges any discharges to the storm sewer system that violate the City's ordinance, and consider in particular, disposal of grass clippings and dog waste to the storm sewer.

(2) designate SSOs that enter the stormwater system as illicit discharges.

(3) track and report these incidents and include them in the City's illicit discharge program described in its standard operating procedures (SOPs).

Recommended actions: *None.*

Field Screening and On-Site Investigations for Illicit Discharges (Permit Section I.A.1.b.2 and b.3)

Norfolk provided copies of its Standard Operating Procedures (SOPs) entitled *Illicit Discharges*, *Reporting Illicit Discharges*, and *Dry Weather Sampling*. Norfolk's field screening procedures consist of dry weather inspections of storm sewers at 25 random locations around the City to identify possible illicit discharges or cross connections with the sanitary sewer. The City investigates any dry weather flow it finds. Ms. Moser conducts the field screening and collects a field sample for detergents, chlorine, copper phenols, pH, salinity, temperature, dissolved oxygen and turbidity, if any flow is found. Field screening found one dry weather flow in 2003 and no flows in 2004. The 2005 field screening is scheduled for June. The 2003 flow turned out to be retained, clean stormwater from a parking lot. City stormwater inspections do not include screening for non-stormwater discharges; the inspections are focused entirely on City-owned BMPs. If the inspector observed evidence of a non-stormwater discharge during a BMP inspection, the inspector would attempt to determine its source and take steps to halt any inappropriate discharge.

The City receives complaints from residents about possible improper disposal of material involving storm drains. City staff (usually Ms. Moser) respond to all environmental complaints. Approximately 108 complaints were received in FY04, not including those that involved SSOs. The City can issue a summons and require immediate clean-up. Staff stated that most complaints pertain to erosion/sediment control. Some complaints are determined to be illicit discharges; in FY04, the City reported 12 illicit discharges. The City also noted that 22 regular SSOs and more than 100 SSOs associated with Hurricane Isabel also impacted the storm sewer system. Of the 108 complaints, City staff wrote 44 Notices of Violation. All violations were corrected with no further enforcement action needed.

Required actions: *Section I.A.1.b.2 of Permit No. VA0088650 requires that the City's screening procedures place priority on segments of the storm sewer system which receive discharge from industrial and commercial sources. Thus, the City must prioritize its screening at locations throughout the storm sewer system to focus on those locations that receive discharge from industrial and commercial sources.*

Recommended actions: *The City should ensure that all staff conducting field screening and investigations of illicit discharges are familiar with and adequately trained in the City's SOPs.*

Spill Prevention, Containment, and Response Program (Permit Section I.A.1.b.4)

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The City's planned response to spills is implemented well. The MS4 audit team interviewed Mr. Jim Stanek, one of the City's two Hazmat/Fire Investigators that implement the Hazmat Plan, responding to all spills of any type throughout the City. Mr. Stanek stated that they initially contain and evaluate the spill and then contact the appropriate staff or contractors to stop or clean up the spill. They have an on-call contractor for clean-ups; this contractor is required to respond within 30 minutes during working hours and within 45 minutes at other times. For spills that could reach the storm sewer system, the Hazmat investigators call the City Environmental Stormwater Management staff, who will also visit the site. Mr. Stanek estimated that there are about five spills per week.

Hazmat staff do not use written spill response procedures, instead relying on their experience in responding to spills. The staff appear to be highly trained in identifying the source and contents of a spill, using a field testing kit when needed. The Hazmat team has the equipment to keep spilled material out of the storm drain. They also have boats available, and 100 feet of river booms, if a callout involves the shoreline.

Required actions: None.

Recommended actions: The current Hazmat staff are highly experienced in responding to spills. However, the program may expand to include additional investigators with less experience in Norfolk's regulations and requirements. For this reason, it is recommended that the City develop a detailed SOP for spill response, including identification of personnel and agencies to be notified in the event of discharges to the storm sewer.

Public Reporting of Illicit Discharges or Water Quality Impacts (Permit Section I.A.1.b.5)

The Division of Environmental Stormwater Management has a Business Partners for Clean Water program that works with area businesses to develop environmental friendly work practices. They have provided workshops for the power wash, car wash, landscaping, and swimming pool industries. The main focus of the program for this fiscal year is industrial sites, shipyards and marinas, and construction contractors. Companies attending the training are published in the local newspaper (the *Compass*). Norfolk has also developed and distributed educational materials for businesses and residents and has a web site with information on stormwater impacts and a Hotline for reporting environmental crimes.

The City's Memorandum of Agreement with Hampton Roads Planning District Commission (HRPDC) indicates that HRPDC will develop public service announcements and handout materials for public education on stormwater issues, including pet waste and household chemical disposal, but not reporting of illicit discharges (see related discussion in the *Hampton Roads Planning District Commission Memorandum of Agreement and Stormwater Program Effectiveness Indicators* section). HRPDC develops these materials through its HR Storm and HR Clean programs. The City provides funding from the stormwater operations budget to HRPDC for these activities. The City's Public Information Specialist generally always includes

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reporting of illicit discharges in her activities. Ms. Moser believes the City's cable channels have not been used to promote public reporting of illicit discharges or other stormwater concerns. The City noted that a campaign titled "Scoop the Poop" was scheduled to be aired on the public access channels.

Required actions: *None.*

Recommended actions: *The City should do the following:*

(1) consider using City cable channels to broadcast stormwater messages, perhaps developed by HR STORM, the regional public education committee.

(2) include a plan and schedule of activities in the updated SWMP that describes HRPDC public education and outreach efforts related to illicit discharge detection and elimination.

Controls to Limit Seepage from Sanitary Sewer to Storm Sewer (Permit Section I.A.1.b.7)

Overflows and seepage from the City's sanitary sewer are managed by the City's wastewater utility. Since implementing an increased sewer cleaning program, Sanitary Sewer Overflows (SSOs) have decreased from about 200 a few years ago to 65 so far this fiscal year. (Only about 25 of these entered storm drains or waterbodies.) Wastewater staff respond to all spills involving the sanitary sewer. They repair pipes and clear blockages that caused the spills. Norfolk recently conducted a sanitary sewer evaluation that involved smoke testing and closed circuit television. This program would have identified cross connections with the storm sewer, but according to City staff, cross connections are very uncommon. Wastewater spills that enter the storm drain are reported to the Division of Environmental Stormwater Management. When possible, wastewater is pumped out of the storm drain to prevent it from entering a waterway. The City is now spending \$17 million per year on capital improvement projects to address problems in the sanitary sewer system.

Some sanitary sewer structures owned by the regional wastewater entity [Hampton Roads Sanitation District (HRSD)] are located within the City. These include pipes, pump stations, and two wastewater treatment plants. Spills and seepages from these facilities are not reported to the Division of Environmental Stormwater Management.

The City has a "Fight the Fat" program to educate residents regarding proper disposal of grease. Inserts with information about the program are included in utility bills. The Division of Environmental Stormwater Management will also send notices to each apartment in a complex if there are stormwater problems.

Required actions: *In accordance with Section I.A.1.b.7 of Permit No. VA0088650, the City must establish a plan and schedule to continue to detect cross connections between the sanitary and storm sewers including the section of the sewer system maintained by HRSD.*

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Recommended actions: *The City should consider conducting the “Fight the Fat” program with restaurants, gas stations, and other commercial and industrial facilities that have potential to discharge oil and grease.*

Runoff from Industrial Facilities (Permit Section I.A.1.c)

Per Section I.A.1.c of Permit No. VA0088650, the City must implement a program to monitor and control pollutants in stormwater discharges from municipal landfills, hazardous waste treatment, storage and disposal facilities, industrial facilities subject to Section 313 of the Emergency Planning and Community Right to Know Act, and facilities determined by the permittee to be contributing substantial pollutant loadings.

The City relies on the Fire Marshals office (i.e., Hazmat staff) to conduct inspections of industrial and commercial facilities and review Storm Water Pollution Prevention Plans (SWPPPs). However, these staff do not review SWPPPs or specifically focus on stormwater concerns during inspections. In addition, the two Hazmat staff are unable to provide adequate inspection coverage of all industrial and commercial facilities throughout Norfolk. Although they plan to begin training new Hazmat staff bringing the total to eight staff, it is uncertain that even this number of staff will be able to inspect all the facilities.

The City believes that industrial or commercial facilities with State-issued stormwater permits are inspected by the State and that facilities without State permits are the City’s responsibility. However, the City has not conducted inspections of any commercial or industrial facilities except for BMPs. Furthermore, the City has not identified and developed a list of commercial or industrial facilities.

Required actions: *In accordance with Section I.A.1.c of Permit No. VA0088650, the City must do the following:*

- (1) develop a list of municipal landfills, hazardous waste treatment, storage and disposal facilities, industrial facilities subject to Section 313 of the Emergency Planning and Community Right to Know Act, and facilities determined by the permittee to be contributing substantial pollutant loadings.*
- (2) develop a list of high priority facilities not covered by VPDES permits.*
- (3) develop an inspection schedule that places priority on those facilities that pose potential threats to water quality.*
- (4) develop a monitoring program if needed for industrial and commercial facilities.*
- (5) revise the industrial inspection procedures to ensure that the inspection focuses on discharges to stormwater.*
- (6) ensure adequate staff and resources are available to implement the industrial inspection program.*

Recommended actions: *None.*

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Runoff from Construction Sites (Permit Section I.A.I.d)

The City requires that construction sites use structural and non-structural BMPs from the Virginia Sediment and Erosion Control Handbook.

Currently Norfolk has three State-certified inspectors, and two State-certified plan reviewers . McCarthy, who has primary responsibility for inspections at construction sites, Ms. Moser, who has primary responsibility for BMP inspections and William Rhees who has primary responsibility for storm water engineering. Because there is only one inspector focused on construction site inspections, the inspections are primarily performed in response to complaints. Five additional building inspectors in Planning and Community Development and three Public Works inspectors are trying to become State-certified to provide greater inspection coverage in the City.

Mr. McCarthy documents his inspections on the Bureau of Environmental Services Erosion and Sediment Control Inspection report form. During the inspection, Mr. McCarthy reviews the construction entrance, inlet and outlet protection, silt fence, sediment trap/basin, diversion dikes/berms, soil stockpile stabilization, and tree protection. He does not check the site's paperwork. Specific deficiencies are documented, and a copy of the inspection report is provided to the land disturber or builder immediately for corrective action. A date by which the site must come back into compliance is included on the report. Mr. McCarthy noted that he takes photographs to accompany his inspection reports.

Although the City has the ability to issue a summons, Norfolk does not have enforcement response procedures or a protocol (i.e., guidelines describing the types of circumstances when enforcement actions should be taken and escalated).

A review of inspection files showed these findings:

- Inspections conducted at the St. Patrick School in the timeframe of 10/2/04 through 4/20/05 showed recurring noncompliance related to inlet protection and construction entrance with no enforcement action taken.
- Inspections conducted at the Bolling Square Townhouse/Apartments in the timeframe of 12/7/04 through 4/20/05 showed recurring problems related to inlet protection (not installed effectively), construction entrance (not installed), and silt fence (not installed). No enforcement action was taken.

The MS4 audit team observed the City inspector conduct inspections at Bolling Square Apartments and St. Patrick School, as well as an informational visit to the East Beach development. Reports on these inspection observations are presented in Appendix B, including detailed findings. The following is a summary of findings from the inspection observations:

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- The City inspector identified several erosion and sediment issues, such as missing or damaged inlet protection and construction entrance problems. However, the inspector did not note a number of instances of damaged or untrenched silt fence at points of potential discharge.
- The City inspector responded to violations at Bolling Square Apartments of the same type as previous inspections (based on records review) by scheduling a reinspection for three days later, but no other enforcement action was mentioned.
- Examining sources of pollutants other than sediment, such as mortar mixing and petroleum product storage, is not part of the City inspector's inspection procedures. City officials indicated that Fire Marshal inspectors may inspect petroleum product storage areas at construction sites in the future.

Based on findings from a comprehensive program review performed by DCR, the City is proposing to implement an alternative inspection program for construction sites. The alternative program will involve building inspectors and public works inspectors becoming State-certified (as mentioned above). Once certified, these inspectors will be observing erosion and sediment control measures while on the construction site conducting the inspections for which they are responsible. This alternative inspection program, which should provide better inspection coverage, will be proposed to DCR for consideration.

Required actions: *None.*

Recommended actions: *The City should do the following:*

- (1) consider approving VSMP land disturbance permits only after confirmation that owner or operator of a construction site has applied for a State NPDES permit.*
- (2) ensure that the building and public works inspectors proceed to obtain their erosion and sediment control certification as expeditiously as possible in order to achieve greater inspection coverage of construction sites in the City.*
- (3) develop enforcement procedures which address recurring cases of noncompliance at construction sites and when enforcement should be escalated. Escalation of enforcement at sites with recurring noncompliance should occur in a reasonable timeframe.*

Regarding construction site inspections, the City should:

- (1) evaluate silt fences at potential discharge points (such as around storm drain inlets and at low points of the site perimeter) for tears and untrenched sections.*
- (2) consider expanding the scope of the erosion and sediment control inspection to*
 - *incorporate review of petroleum product storage and mortar or concrete wastes*
 - *review paperwork to verify the existence of a VPDES stormwater permit and a Storm Water Pollution Prevention Plan on site.*

Annual Report (Permit Section I.A.3)

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Section I.A.3 of Permit No. VA0088650 requires the City to submit an Annual Report which includes all the information and data listed in this section of the permit. The MS4 audit team compared the data which are required to be included in the Annual Report with the FY04 Annual Report. The FY04 Annual Report did not include the following items:

- A listing of any facilities identified and inspected under Part I.A.1.c.(1), a summary of any controls established for these facilities, and the implementation schedule established (specified in Section I.A.3.a.5).
- Results of any monitoring performed in accordance with Part I.A.1.c.(2) of the permit (specified in Section I.A.3.a.6).

In addition, Section I.A.3.g specifies that information on the “Identification of water quality improvements or degradation” be included in the Annual Report. The FY04 Annual Report states that it is not possible at this time to identify water quality trends.

Required Actions: In accordance with Section I.A.3 of Permit No. VA0088650, the City must include the following information in its Annual Report:

- A listing of any facilities identified and inspected under Part I.A.1.c.(1), a summary of any controls established for these facilities, and the implementation schedule established (specified in Section I.A.3.a.5)
- Results of any monitoring performed in accordance with Part I.A.1.c.(2) of the permit (specified in Section I.A.3.a.6).

Recommended Actions: The City should consider documenting Section 303(d) impaired waters and waters with developed Total Maximum Daily Loads as part of the permit requirements in Section I.A.3.g related to “Identification of water quality improvements or degradation.”

Hampton Roads Planning District Commission (HRPDC) Memorandum of Agreement (MOA) and Stormwater Program Effectiveness Indicators (Permit Section I.C)

Norfolk has a MOA with the HRPDC dated September 5, 2003, and effective through December 31, 2007, to perform certain services related to Norfolk’s stormwater management program.

The MOA states that the Local Government responsibilities are as follows:

- Appoint a representative and alternate to the Regional Storm Water Management Committee.
- Appoint a representative and alternate to the Public Information & Education Subcommittee (HR STORM).
- Provide all locally generated data required for VPDES permits.
- Provide technical review of HRPDC analyses and conclusions.
- Support HRPDC annual funding.

Mr. Hugo Valverde, Physical and Environmental Planner with HRPDC, noted that HRPDC facilitates communication between the communities within the region and with State and EPA;

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conducts a regional Public Education program (i.e., HR STORM), provides education to City employees; and generally provides support to the local governments in complying with their VPDES permits. HRPDC maintains a stormwater program effectiveness indicators tracking database, which tracks and maintains the indicator data collected by the local governments. Data from this database are used to provide the summary of stormwater program effectiveness indicators for Norfolk's Annual Reports. Mr. Valverde indicated that stormwater or in-stream monitoring to evaluate the City's stormwater program effectiveness was not included when the City's current permit was reissued in 2001 because the variability in monitoring results did not allow meaningful data analyses.

Section I.C of Permit No. VA0088650 requires the City to collect various types of data for its stormwater program effectiveness indicators. The MS4 audit team compared the data to be tracked for each indicator (per the permit) and the data reported in the FY04 Annual Report. The results of this comparison are presented in the following table.

Stormwater Program Effectiveness Indicators	
Indicator	Comments
Greenlands (Permit Section I.C.2.a)	Greenlands data are reported in the FY04 Annual Report. However, neither the Bureau of Environmental Services nor Division of Environmental Stormwater Management staff knew exactly which types of lands (e.g., Resource Protection Areas) are being counted as Greenlands.

Stormwater Program Effectiveness Indicators	
Indicator	Comments
BMP implementation (Permit Section I.C.2.b)	The FY04 Annual Report stated that information on the number of developed acres served by BMPs is not currently maintained. However, City staff indicated that they do maintain acreage information and thought these data were included in the City's submission for input into the HRPDC database. Mr. Valverde of HRPDC was uncertain whether Norfolk had included the acreage data in its submission to HRPDC.
Erosion and sediment control (Permit Section I.C.2.c)	The FY04 Annual Report states that all inspections conducted in 2004 (i.e., inspections at 420 sites) revealed that corrective actions were necessary to fully comply with the City's Erosion and Sediment Control Ordinance, and that the City was required to carry out enforcement actions during these inspections. It is uncertain whether this means that 420 enforcement actions were taken and what types of actions were taken.
Flooding and drainage responses (Permit Section I.C.2.d)	The FY04 Annual Report states that the City responded to more than 1,450 inquiries but doesn't include the type of responses as required by the permit.

Stormwater Program Effectiveness Indicators	
Indicator	Comments
Investigative monitoring (Permit Section I.C.2.f)	The FY04 Annual Report does not include a description of the measures taken to locate and eliminate illicit discharges or connections as required by the permit.
Permitting and compliance (Permit Section I.C.2.h)	The FY04 Annual Report stated that information on associated developed or redeveloped acres is not currently maintained. However, City staff indicated that they do maintain acreage information and thought these data were included in the City's submission for input into the HRPDC database. Mr. Valverde of HRPDC was uncertain whether Norfolk had included the acreage data in its submission to HRPDC.
Environmental knowledge (Permit Section I.C.2.i)	The FY04 Annual Report does not specify or include information on riparian restoration activities by citizens, stream clean-up activities or web site hits as required by the permit.

Stormwater Program Effectiveness Indicators	
Indicator	Comments
Water Quality Nutrient Loadings (Permit Section I.C.2.j)	The FY04 Annual Report and two previous annual reports state that due to minor land use changes, loading estimates calculated for the FY2001 Annual Report are representative of the current year. Thus, no recalculations of water quality nutrient loadings have been done for several years. Section I.C.2.j states that the Event Mean Concentrations (EMC) will be calculated in Permit Year 5. City staff indicated that they did not have plans to perform the EMC calculations as the permit requires.

As presented in the *Enforcement of the Comprehensive Plan, Master Plan, and Other Related Ordinances Pertaining to Development and Redevelopment* section of this report, Norfolk's City Council approved changing the City's Resource Protection Areas to Intensely Developed Areas. These changes will be submitted to the State for a consistency review in June 2005. It is unclear how the proposed changes will affect the effectiveness of the City's stormwater management program and the goal of improved water quality.

Required actions: Per Section I.C of Permit No. VA0088650, the City must:

- (1) maintain and report on all data for its stormwater program effectiveness indicators in its Annual Report.
- (2) track and report the number of Greenland acres. The City must define what is being included in the Greenlands acres reported in the Annual Report (e.g., does it include the RPA, parks, wetlands, etc.) and ensure that acres being reported are being accurately tallied.
- (3) recalculate the Event Mean Concentrations in Year 5 of the permit.
- (4) consider whether stormwater monitoring may be appropriate to assess the

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stormwater program effectiveness and impact on water quality [40 CFR Part 122.26 d(2)].

Recommended actions: *The City should do the following:*

(1) ensure that it communicates and coordinates both within the City between the Bureau of Environmental Services and the Division of Environmental Stormwater Management and with HRPDC regarding the sharing of stormwater program effectiveness indicator data so that the City's Annual Report accurately reflects the data that the City is collecting.

(2) evaluate options for how water quality nutrient loadings should be calculated and reported in its Annual Report. For example, the City should review the model used to calculate the loadings estimates in FY 2001 and determine whether the model and/or input parameters should be revised to actually reflect pollutants being removed through BMP implementation in the City such as street sweeping.

(3) use the estimated pollutant loadings to identify and prioritize the locations and types of BMPs to be implemented.

For its upcoming permit resissuance in 2006, the City should consider the following:

Evaluate what indicators would be appropriate to accurately reflect the City's stormwater program effectiveness in removing pounds of pollutants of concern. The ultimate goal of the City's stormwater program effectiveness is to show improvement in water quality. In the Chesapeake Bay watershed, this translates into the pounds of phosphorus, nitrogen, and sediment that were reduced or removal of specific stream/river segments from the 303(d) list because of the stormwater program. For example, the City should consider the annual pounds of fertilizers applied and reduced.

City Resources/Budget

The approved operating budget for FY2004 was approximately \$7.4 million with \$2 million designated for CIP projects. Per Chapter 41.1-24 of the City Code, the City established a stormwater utility fund to cover expenditures such as operation, maintenance, and repair of the system; management services; and debt financing. Monies deposited into the stormwater utility come from stormwater management fees charged to both residential and nonresidential properties. City staff stated that there has been no increase in stormwater management fees since 1998. Several elements of the City's stormwater management program do not appear to have adequate resources and staff for implementation (e.g., maintenance activities, capital improvements, industrial facility inspections, construction site inspections).

Required actions: *None.*

Recommended actions: *The City should consider the following:*

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(1) evaluate whether sufficient resources and staff have been allocated to implement the stormwater program and consider evaluating additional funding mechanism sources (e.g., storm sewer inspection fees) to generate funds for the MS4 program. If additional revenue is unavailable, current spending priorities should be re-evaluated and revised to give priority to those program items necessary for permit compliance and environmental health and safety. For example, the City should evaluate whether it is more effective to spend more funds on street sweeping or reallocate some funds from street sweeping to hire an additional City Erosion and Sediment Control inspector.

(2) promote an incentive program that has a higher storm water utility fee, but allows for reductions if a landowner participates in storm water management (e.g., creates or converts impervious areas to bio-retention areas, installs low impact development practices, or allows storm water management structures to be placed on their property).